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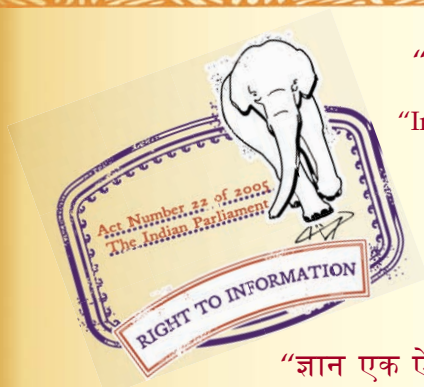
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IS 3549 (1983): Water Suction and Discharge Hose of Rubber, Heavy Duty (Covers IS 2410 : 1963 Also) [PCD 13: Rubber and Rubber Products]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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(Reaffirmed 2012)

Indian Standard

SPECIFICATION FOR WATER SUCTION AND DISCHARGE HOSE OF RUBBER, HEAVY DUTY

(*First Revision*)

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR WATER SUCTION AND DISCHARGE HOSE OF RUBBER, HEAVY DUTY

(First Revision)

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Indian Standard

SPECIFICATION FOR WATER SUCTION AND DISCHARGE HOSE OF RUBBER, HEAVY DUTY (*First Revision*)

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 8 September 1983, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 An important difference between suction hose and other types of hoses is the need to prevent collapse of the walls under vacuum. This is achieved by the introduction of internal spiral wire and also an external spiral wire reinforcement. If the liquids are non-corrosive and do not carry solids in suspension, as in the case with water, rough bore hose is used; in other cases smooth bore hose is used.

0.3 This standard was first published in 1965 and covered hoses suitable for working pressure up to 0.7 MPa* only. In this revision hoses suitable for working up to 1.0 and 1.5 MPa pressure are being included. Further the hoses with internal diameter of 200 and 250 mm have also been added. Some of the constructional details like thickness and pitch of wire have been deleted.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard

*1 MPa = 10.2 kgf/cm².

†Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes the requirements and methods of test for water suction and discharge hose of rubber, heavy with woven fabric and spiral wire reinforcement for use at maximum working pressures of 0.7, 1.0 and 1.5 MPa*.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in various parts of IS : 7503† shall apply.

3. TYPES

3.1 The hose shall be of two types as indicated below:

Type 1 — Hoses having rough bore

Type 2 — Hoses having smooth bore

4. REQUIREMENTS

4.1 Material

4.1.1 Lining and Cover — The lining and cover shall be made from a suitable compound and shall be free from air blisters, porosity or any other visible defects.

4.1.2 Reinforcement — The reinforcement shall be of woven fabric applied on bias at approximately 45° angle. The woven fabric shall be well rubberized with a suitable rubber compound.

NOTE — Fabrics of cotton, rayon or synthetic fabrics may be used for reinforcement, provided that it complies with the test requirements specified in this standard.

4.1.3 Spiral Wire — The wire used for the helical reinforcement shall be galvanized steel wire (see IS : 280-1978‡).

4.2 Dimensions and Tolerances

4.2.1 The bore size when measured according to the method prescribed in 4.2.1.2 of IS : 443-1975§ shall be as given in Table 1.

4.2.2 Thickness of Lining, Filler and Cover — The thickness of lining, filler and cover shall not be less than that specified in Table 2. The thickness shall be measured according to the method prescribed in 4.2.2 of IS : 443-1975§.

*1MPa = 10.2 kgf/cm².

†Glossary of terms used in rubber industry (issued in several parts).

‡Specification for mild steel wire for general engineering purposes (third revision).

§Methods of sampling and test for rubber hoses (second revision).

TABLE 1 BORE SIZES WITH TOLERANCES

(Clause 4.2.1)

SL No.	NOMINAL BORE SIZE	TOLERANCE ON BORE SIZE
(1)	(2)	(3)
	mm	mm
i)	25·00 }	±1·25
ii)	31·50 }	
iii)	38·00 }	±1·50
iv)	45·00 }	
v)	50·00 }	
vi)	56·00 }	
vii)	63·00 }	
viii)	75·00 }	±2·00
ix)	100·00 }	
x)	125·00 }	
xi)	150·00 }	
xii)	200·00 }	±3·00
xiii)	250·00 }	

4.3 Length

4.3.1 Unless specified otherwise, the hose shall be supplied in following lengths which shall be in multiples of 1·5 metres:

<i>Nominal Bore</i>	<i>Length of Hose</i>
mm	m
Up to 75	6 to 15
Above 75	3 to 6

4.3.2 The length of soft ends (ends free of wire) shall be as follows:

<i>Nominal Bore</i>	<i>Length of Soft Ends</i>
mm	mm
Up to and including 75	80 ± 5
100	105 ± 5
125 to 250	145 ± 5

Length of the soft end, and end connections if any, shall be included in the hose length.

4.3.3 Tolerance on any hose length shall +2, —1 percent and for this purpose the length shall be measured before the hose is subjected to hydraulic pressure test.

4.4 End Connections — The hose shall be either with or without built-in nipples as agreed to between the purchaser and the supplier.

**TABLE 2 MINIMUM THICKNESS OF LINING, FILLER
AND COVER OF THE HOSE**

(Clause 4.2.2)

Sl. No.	NOMINAL BORE SIZE	MINIMUM THICKNESS OF LINING	MINIMUM THICKNESS OF FILLER	MINIMUM THICKNESS OF COVER
(1)	(2)	(3)	(4)	(5)
mm	mm	mm	mm	mm
i)	25.00	2.0	1.0	1.5
ii)	31.50	2.0	1.0	1.5
iii)	38.00	2.0	1.0	1.5
iv)	45.00	2.0	1.0	1.5
v)	50.00	2.5	1.0	1.5
vi)	56.00	2.5	1.0	1.5
vii)	63.00	2.5	1.0	1.5
viii)	75.00	2.5	1.0	1.5
ix)	100.00	3.0	1.5	1.5
x)	125.00	3.0	1.5	2.0
xi)	150.00	3.0	1.5	2.0
xii)	200.00	3.5	2.0	2.0
xiii)	250.00	3.5	2.0	2.0

4.5 Construction

4.5.1 Hoses Having Rough Bore — The hose having rough bore shall be constructed with the materials in following order:

- Internal wire helix (connected to nipples, if any, by welding or brazing);
- Ply of rubberized textile fabric;
- Rubber compound lining;
- Plies of rubberized textile fabric;
- Embedded wire helix, spiralled (over the nipples, in case of built-in nipples);
- Rubber compound filler;
- Plies of rubberized textile fabric; and
- Rubber compound cover.

4.5.2 Hoses Having Smooth Bore — The hoses having smooth bore shall be constructed with the material in the following order:

- Rubber compound lining;
- Ply or plies of rubberized textile fabric;

- c) Embedded wire helix, spiralled (over the nipples, in case of built-in nipples);
- d) Rubber compound filler;
- e) Ply or plies of rubberized textile fabric,
- f) Embedded wire helix, spiralled (over the nipples, in case of built-in nipples);
- g) Rubber compound filler;
- h) Ply or plies of rubberized textile fabric; and
- j) Rubber compound cover.

NOTE — In case of built-in nipples, the flanges shall be attached to the nipples by welding or any other form as agreed to between the purchaser and the manufacturer so as to provide good anchorage for the hose ends. The design of nipples and the method of building them in the hose shall be the responsibility of the hose manufacturer.

4.5.3 Joining of Wires — Constructional helical reinforcement wires may be joined by welding provided that:

- a) there shall be no such joint in the internal wire helix;
- b) the welding of wires shall be carried out by using electrical butt welding method;
- c) no welding joint shall be within 1.5 metre of the end or the nipple end in case of built-in nipple, or of another weld in the same wire; and
- d) the number of welds shall not exceed one, in a hose up to 6 metres in length and shall not exceed two, in a hose above 6 metres in length.

4.6 Tensile Strength and Elongation at Break — The tensile strength and the elongation at break of the rubber compound used in the lining, filler and cover of the hose shall not be less than 7.0 MN/m² and 300 percent respectively when tested according to the method perscribed in 5 of IS : 443-1975*.

4.7 Accelerated Ageing — After ageing at $70 \pm 1^\circ\text{C}$ for a period of 72 hours in accordance with the method prescribed in 6 of IS : 443-1975*, the rubber used for the lining, filler and cover shall not vary by more than $\pm \frac{10}{15}$ percent for tensile strength and elongation at break of the corresponding values obtained before ageing.

4.8 Hydrostatic Tests — The hose when subjected to the designed hydraulic working pressure in accordance with 8.3 of IS : 443-1975* shall not show any failure or defect at the end of the test.

*Methods of sampling and test for rubber hoses (*second revision*).

4.8.1 The elongation of the hose at its designed working pressure determined in accordance with **8.4** of IS : 443-1975* shall not exceed 7.5 percent of its original length measured at 0.07 MPa hydraulic pressure.

4.8.2 The hose shall be capable of withstanding a pressure equal to 1.5 times the designed working pressure for a period of one minute without any failure or damage to the hose.

4.8.3 Burst Pressure Test — The production sample of hose when tested according to the method prescribed in **8.2** of IS : 443-1975*, shall not burst below three times the designed working pressure of the hose.

4.9 Resistance to Vacuum — When tested in accordance with **14** of IS : 443-1975* under vacuum of 83 KPa (approx 625 mm of mercury), the hose shall not collapse. In case of smooth bore hose, there shall not be any separation of the ply and the lining.

5. PACKING AND MARKING

5.1 Packing — The hose shall be packed as agreed to between the purchaser and the supplier.

5.2 Marking — Each length of the hose shall be indelibly marked, adjacent to each end, with the following:

- a) The manufacturer's name and trade-mark, if any;
- b) The hose denomination, type of hose and maximum working pressure; and
- c) The month and year of manufacture.

5.2.1 Each length of the hose may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors may be obtained from the Indian Standards Institution.

6. SAMPLING

6.1 For the purpose of ascertaining the conformity of the hose in a consignment to this specification, the scale of sampling and the criteria for conformity shall be as prescribed in **3** of IS : 443-1975*.

*Methods of sampling and test for rubber hoses (*second revision*).

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